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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,535	04/15/2004	Tomoaki Shino	251996US2	6547
22850	7590	08/04/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ARENA, ANDREW OWENS	
			ART UNIT	PAPER NUMBER

2811

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/824,535

Applicant(s)

SHINO, TOMOAKI

Examiner

Andrew O. Arena

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/15/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Floating body cell dynamic random access memory with optimized body geometry.

2. The disclosure is objected to because of the following informalities: frequent spelling and grammar mistakes. For example: pg 5 ln 31 "id" should be "is"; pg 7 ln 34 seems awkward, perhaps a "." should precede "BOX" and a ":" should follow "130"; pg 8 ln 9 "is" should be "are"; pg 8 ln 24 "he" should be "the"; pg 9 ln 35 should have a "more" preceding the "than"; pg 12 ln 13 "02 should be "0".

Appropriate correction is required.

3. The disclosure is objected to because of the following informalities: confusing and apparently contradictory statements. Applicant's disclosure teaches an FBC which has a bottom surface contacting the first insulation layer over a larger surface area than the top surface contacts the second insulation layer (FIGS. 2, 3A, 7A, 8, 9, 11, 12, 13; pg 2 ln 24-29; pg 7 ln 4-7; pg 9 ln 8-12; pg 9 ln 23-25; pg 12 ln 15-17), however, some statements refer to an FBC which has a bottom surface contacting the first insulation layer over a smaller surface area than the top surface contacts the second insulation layer (pg 3 ln 12-14; claims 1 and 11). Applicant should clearly indicate which geometrical arrangement(s) are intended to be aspects of the claimed invention. In particular, if applicant means to include both cases (body region top surface having a

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smaller area than bottom surface and body region top surface having a larger area than bottom surface), then any reference to a body regions' surface area should carefully indicate which embodiment is being referenced.

Appropriate correction is required.

Claim Objections

4. Claim 12 is objected to because of the following informality: the last word in the claim is "ling" and should be replaced with "line".

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 4, 6, and 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for contradicting the teachings of the disclosure.

7. Claims 1 and 11 contain the recitation "wherein the area of the body region in contact with the second insulation layer is larger than the area thereof in contact with the first insulation layer." The claims are indefinite because it is confusing, in light of the disclosure, whether applicant intends to claim where the area in contact with the second insulation layer is larger or smaller than the area thereof in contact with the first insulation layer.

8. Claims 4, 6, and 8-12 depend from claim 1, thus they inherit the indefiniteness and are likewise rejected.

9. Claim 7 contains the recitation "...wherein the body region has a thickness equal to or less than five times the thickness of the first insulation layer." Applicant's

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disclosure teaches a body region with a thickness equal to or less than three times the thickness of the first insulation layer (pg 4 ln 14-16; pg 8 ln 28-30; claim 6). The claim is indefinite because it is confusing, in light of the disclosure, which body region thickness applicant intends to claim.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 2, 3, 5, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohsawa (US 2004/0026749), hereinafter Ohsawa.

12. Regarding claim 2, Ohsawa discloses (FIG. 4A) a semiconductor device ([0082] ln 1) comprising:

a semiconductor substrate (11; [0082] ln 4-5);

a first insulation layer (12; [0082] ln 4) formed on the semiconductor substrate;

a semiconductor layer (13; [0082] ln 5) insulated from the semiconductor substrate by the insulation layer;

a source region (16; [0082] ln 11) of a first conduction type [n] and a drain region (17; [0082] ln 11) of the first conduction type [n] formed in the semiconductor layer;

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a body region (13; [0083] In 2) of a second conduction type [p] formed in the semiconductor layer between the source region and the drain region, said body region being capable of storing data by accumulating [0093] or releasing (emitting in [0094]) electric charge;

a second insulation layer (14; [0082] In 10-11) formed on the body region;

a word line (WL) formed on the second insulation layer and insulated from the body region by the second insulation layer; and

a bit line (BL) electrically connected to the drain region,

wherein the first insulation (12) layer has a thickness equal to or less than five times the thickness of the second insulation (14) layer ([0086]).

13. Regarding claim 3, Ohsawa discloses (FIG. 4A) a semiconductor device ([0082] In 1) comprising:

a semiconductor substrate (11; [0082] In 4-5);

a first insulation layer (12; [0082] In 4) formed on the semiconductor substrate;

a semiconductor layer (13; [0082] In 5) insulated from the semiconductor substrate by the insulation layer;

a source region (16; [0082] In 11) of a first conduction type [n] and a drain region (17; [0082] In 11) of the first conduction type [n] formed in the semiconductor layer;

a body region (13; [0083] In 2) of a second conduction type [p] formed in the semiconductor layer between the source region and the drain region, said body region being capable of storing data by accumulating [0093] or releasing (emitting in [0094]) electric charge;

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a second insulation layer (14; [0082] In 10-11) formed on the body region;
a word line (WL) formed on the second insulation layer and insulated from the body region by the second insulation layer; and
a bit line (BL) electrically connected to the drain region,
wherein the body region (13) has a thickness equal to or less than three times the thickness of the first insulation (12) layer ([0086]).

14. Regarding claim 5, Ohsawa discloses the semiconductor device according to claim 3, wherein the first insulation (12) layer has a thickness equal to or less than five times the thickness of the second insulation (14) layer ([0086]).

15. Regarding claim 7, Ohsawa discloses the semiconductor device according to claim 2, wherein the body (13) region has a thickness equal to or less than five times the thickness of the first insulation (12) layer ([0086]).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Assaderaghi et al (US 5,784,311) teaches a floating body cell dynamic random access memory device including two MOSFETs, one as the charge storage memory cell, the other in a periphery region for logic control.

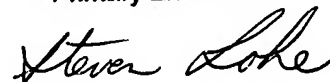
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is (571) 272-5976. The examiner can normally be reached on M-F 8:30-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven Loke
Primary Examiner

A handwritten signature in black ink that reads "Steven Loke". The signature is written in a cursive style with a large, stylized "S" and "L".